

CLAIMS

1. A living body photometric apparatus comprising:
a light source portion for irradiating light beams
having predetermined frequencies to a plurality of
5 positions in a measurement region of a subject during
an interval including a period when giving a
predetermined stimulation task to the subject and a
period not giving the same;

an optical measurement portion for measuring light
10 beams brought about by the irradiated light beams at
a position near the light beam irradiation position and
for determining measurement data at a plurality of
measurement points from the measured light beams;

a signal processing portion for calculating from
15 the plurality of measured data at least one stimulation
task signal of which principal component is a signal
brought about by the stimulation task given to the
subject; and

means for identifying a measurement point or a
20 region where responds most to the stimulation task by
making use of the at least one stimulation task signal
calculated by the signal processing portion.

2. A living body photometric apparatus comprising:
a light source portion for irradiating light beams
25 having predetermined frequencies to a plurality of
positions in a measurement region of a subject during
an interval including a period when giving a

predetermined stimulation task to the subject and a period not giving the same;

an optical measurement portion for measuring light beams brought about by the irradiated light beams at a position near the light beam irradiation position and for determining measurement data at a plurality of measurement points from the measured light beams;

a signal processing portion for performing an imaging processing of the measurement data from the optical measurement portion and for calculating from the plurality of measured data at least one stimulation task signal of which principal component is a signal brought about by the stimulation task given to the subject;

means for calculating an occupying ratio of the plurality of respective measured data in the stimulation task signal; and

a displaying means for displaying the stimulation task signal calculated and the calculated occupying ratio of the plurality of respective measured data in the stimulation task signal.

3. A living body photometric apparatus according to claim 2, wherein the light source portion includes a light source for emitting a plurality of light beams having wavelengths near infrared region of which absorbances with respect to oxy hemoglobin and deoxy hemoglobin in blood of a living body are different,

optical modules for modulating differently the wavelengths of the light beams emitted from the light source in the number corresponding to the irradiation positions and irradiation use optical fibers for transmitting the light beams output from the optical modules onto a plurality of different positions of the subject.

4. A living body photometric apparatus according to claim 2, wherein the optical measurement portion includes a plurality of detection use optical fibers which are respectively disposed near the plurality of respective irradiation use optical fibers and guide and transmit the light beams passed inside the subject, a plurality of photo electric converting devices for converting the light beams transmitted by the respective detection use optical fibers into electrical signals, a signal separation and extraction circuit for determining measurement data of the respective measurement points by making use of output signals of the plurality of photo electric converting devices.

5. A living body photometric apparatus according to claim 2, wherein the stimulation task signal is displayed in a waveform defined by two coordinate axes of signal intensity and time.

6. A living body photometric apparatus according to claim 5, further comprising means for generating a stimulation response and reference pattern in response

to the task stimulation of the living body and displaying the same on the displaying means while overlapping on the stimulation task signal waveform.

7. A living body photometric apparatus according
5 to claim 6, wherein the stimulation response and reference pattern is stored in a memory means.

8. A living body photometric apparatus according
to claim 6, wherein the stimulation response and
reference pattern is determined when an operator inputs
10 through an input means data for modifying the pattern
with respect to a preset pattern.

9. A living body photometric apparatus according
to claim 2, further comprising means for displaying
occupying ratios of the respective plurality of
15 measurement data calculated in the stimulation task
signal.

10. A living body photometric apparatus according
to claim 9, further comprising means for displaying a
measurement data having the maximum occupying ratio
20 among the occupying ratios of the respective plurality
of measurement data calculated in the stimulation task
signal in a discriminable manner from the other
measurement data.

11. A living body photometric apparatus according
25 to claim 9, further comprising means for calculating
an average value after adding numerical values of the
occupying ratios of the respective plurality of

measurement data calculated in the stimulation task signal as well as for displaying the calculated average value after the addition near the graph.

12. A living body photometric apparatus according to claim 6, further comprising means for calculating a correlation between the stimulation task signal and the stimulation response and reference pattern and for displaying the calculated correlation value in numerical value near the display positions thereof.

10 13. A living body photometric apparatus comprising:

a light source portion for irradiating light beams having predetermined frequencies to a plurality of positions in a measurement region of a subject during an interval including a period when giving a predetermined stimulation task to the subject and a period not giving the same;

an optical measurement portion for measuring light beams brought about by the irradiated light beams at a position near the light beam irradiation position and for determining measurement data at a plurality of measurement points from the measured light beams;

a signal processing portion for performing an imaging processing of the measurement data from the optical measurement portion, further for performing principal component analysis for the plurality of measured data and for extracting a representative

signal which most reflects a living body reaction when the stimulation task is given; and

a displaying means for displaying the signals processed and /or extracted by the signal processing
5 portion.

14. A living body photometric apparatus comprising:

a light source portion for irradiating light beams having predetermined frequencies to a plurality of
10 respective positions in right and left temporal lobes of a subject during an interval including a period when giving a predetermined stimulation task to the subject and a period not giving the same;

an optical measurement portion for measuring light
15 beams brought about by the irradiated light beams at a position near the light beam irradiation position and for determining measurement data at a plurality of measurement points from the measured light beams;

a signal processing portion for performing an
20 imaging processing of the measurement data from the optical measurement portion, further for performing principal component analysis for the plurality of measured data and for extracting a representative signal which most reflects a living body reaction when
25 the stimulation task is given;

means for calculating contribution rates of the respective measurement signals with respect the

representative signal;

means for separating the calculated contribution rates of the respective measurement signals for the right and left temporal lobes and for averaging thereof
5 after adding the same; and

a displaying means for displaying the averaged values after addition for the right and left temporal lobes determined by the averaging means after addition in a discriminable manner.

10 15. A living body photometric apparatus according to claim 14, further comprising a calculating means for calculating hemisphere dominance representing which of right or left hemisphere in the brain of the subject responds dominantly to the stimulation task by making
15 use of the averaged values after addition for the right and left temporal lobes.

16. A living body photometric apparatus according to claim 15, further comprising means for displaying the hemispheric dominance determined by the calculation
20 means on a display screen of the displaying means.

17. A living body photometric apparatus according to claim 16, wherein the discrimination of the right and left hemispheres is effected by symbols or letters and the degree of the hemispheric dominance is displayed
25 by numerals.